PCT/US99/

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 20 June 2001 (20.06.01)	
International application No. PCT/US99/22779	**Applicant's or agent's file reference** DN1999093
International filing date (day/month/year) 30 September 1999 (30.09.99)	**Priority date** (day/month/year)
Applicant GIRAULT, Jean-Marie et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

15 February 2001 (15.02.01)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Henrik Nyberg
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

COHN, Howard M.
c/o Robert W. Brown, Dept.823
The Goodyear Tire & Rubber Company
1144 East Market Street
Akron, OH 44309-3531
ETATS-UNIS D'AMERIQUE

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing *(day/month/year)* 21.01.2002

Applicant's or agent's file reference
DN1999093

IMPORTANT NOTIFICATION

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US99/22779	30/09/1999	30/09/1999

Applicant
THE GOODYEAR TIRE & RUBBER COMPANY et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/
European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer
Mummery, T

Tel.+49 89 2399-8212

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
DN1999093		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US99/22779	30/09/1999	30/09/1999
International Patent Classification (IPC) or national classification and IPC B60C17/00		
Applicant THE GOODYEAR TIRE & RUBBER COMPANY et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☒ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
15/02/2001	21.01.2002
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Buergo, J Telephone No. +49 89 2399 8884

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/22779

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-4,6-20	as originally filed			
5,5A	as received on	17/11/2001	with letter of	05/11/2001

Claims, No.:

1-20	as received on	17/11/2001	with letter of	05/11/2001

Drawings, sheets:

1/5-5/5	as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-20
	No:	Claims	
Inventive step (IS)	Yes:	Claims	5,9,13
	No:	Claims	1-4,6-8,10-12,14-20
Industrial applicability (IA)	Yes:	Claims	1-20
	No:	Claims	

2. Citations and explanations
   see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

V. Reasoned stat_ment

2. Citations and explanations

2.1 Document GB-A-867 103 (D1), which is considered to represent the most relevant state of the art, discloses (cf. page 2, lines 34 to 47, Figs. 1 and 2) a pneumatic runflat tire **1** having two sidewalls **2** and two wedge inserts **3** disposed on an inner surface of each sidewall, each wedge insert comprising a plurality of circumferentially disposed segments (ribs) **4-8**, each of which is separated from one another, during normal-inflated operation, by a plurality of intervening circumferential grooves (gaps) **9**, and each groove is bounded by an outer surface of a given segment and an inner surface of an adjacent segment, the outer surface of a given segment and the inner surface of an adjacent segment intersecting at a hinge point (not mentioned in D1 but clearly visible in the drawing figures), and the segments **4-8** being therefore able to pivot with respect to each other.

The tread and the carcass referred to in the preamble are common features to all radial tires. D1 is silent about the carcass type, but this feature does not seem to be relevant to the stated object. Since the invention relates to the runflat characteristics of the tire, the skilled person could make use of the sidewall inserts irrespective of the type of carcass ply.

The subject-matter of independent claim 1 does not meet the requirements of Article 33(3) PCT regarding inventive step.

2.2 The additional features of dependent claims 2 to 4 are also known from D1, cf. Figs. 1 and 2. These claims do not involve an inventive step either.

2.3 According to the description, page 16, lines 8-18, the additional feature of dependent claim 5 achieves the effect of preventing axial deflection of the sidewalls during runflat operation, as well as radial deflection. While this is not the solution to the stated problem, it contributes to improving the tire operation. The combination of the features of dependent claim 5 being neither known from, nor rendered obvious by, the available prior art, this claim is considered as involving

an inventive step (Article 33(3) PCT).

2.4 The features introduced by dependent claims 6-8 do not result in any subject-matter which can be considered as involving an inventive step, since they are not relevant to the solution of the stated problem.

2.5 Independent claim 9 is a repetition of claim 5 where the feature of the characterizing portion of claim 1 has been deleted. This claim seems to be superfluous, mainly taking into account that claim 5 has been positively considered. Claim 13 completes the wording of claim 5.

2.6 Claims 10-12 and 14-17, when dependent on claim 5 instead of claim 9, would be equally inventive. However, claims 11 and 12 contain an effect ("axial deflection is substantially prevented") instead of a technical feature.

2.7 The subject-matter of claims 18-20 cannot be considered as involving an inventive step, as already seen in section 2.4 above.

VII. Certain defects

The international application does not meet the requirement of Rule 6.1(a) PCT, which says that the number of claims shall be reasonable in consideration of the nature of the invention claimed. It is referred in particular to claims 9 to 20.

VIII. Certain observations

The vague and imprecise statement in the description on page 20 ("... the spirit and scope of the invention ...") implies that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity (Article 6 PCT) when used to interpret them (see also the PCT Guidelines, III-4.3a).

10/088198
JC13 Rec'd PCT/PTO 15 MAR 2002
US9922779

the invention described by the PCT/US98/13929 application thus addresses the design goals of full-inflated riding comfort, tire weight and extended runflat service life.

Another example of a tire designed to be usable without normal inflation pressure is found in Great Britain Patent Specification No. 867,103, published May 3, 1961, which discloses a tire having a stiffener made of rubber and attached to the inside of each sidewall. The stiffener extends circumferentially, continuously all the way round the sidewall of the tire, and extends radially from a point near the radially inner extremity of the tire to a point near the center of the tread. The stiffener is divided into individual circumferential ribs, separated from each other by wedge-shaped gaps.

OBJECTS OF THE INVENTION

It is an object of the present invention to provide a runflat radial tire as defined in one or more of the appended claims and, as such, having the capability of being constructed to accomplish one or more of the following subsidiary objects.

One object of the present invention is to provide a runflat radial tire having one or more wedge inserts in each sidewall, the axially innermost or first wedge insert providing to each sidewall a minimal reinforcing rigidity during full-inflated operation and maximum reinforcing rigidity during runflat operation, thereby providing improved riding comfort and handling characteristics during normal-inflated operation as well as rigid structural support during runflat operation.

Another object of the present invention is to provide a runflat radial tire that contains sidewall-reinforcing wedge inserts that are light in weight and which contribute minimal excess rolling resistance during normal-inflated operation.

Yet another object of the present invention is to provide a runflat tire having a reduced heat generating potential during both normal inflated, high-speed operation and during runflat operation.

Still another object of the present invention is to

provide a tire having an increased runflat operational service life and improved handling characteristics.

And yet another object of the present invention is to apply the inventive concept to a variety of alternative carcass constructions, as described herein.

SUMMARY OF THE INVENTION

The present invention relates to a pneumatic radial ply runflat tire having a tread, a carcass comprising a radial ply structure, a belt structure located between the tread and the radial ply structure, an innerliner and two sidewalls each reinforced by one or more wedge inserts. The first or

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13 Rec'd PCT/PTO 15 MAR 2002

What is claimed:

1. A pneumatic radial ply runflat tire (70, 100) having a tread (72), a carcass structure (86) comprising at least one radial carcass ply (88), two sidewalls (80,82) and at least one wedge insert (50a', 50b') disposed on an inner surface of each sidewall (80, 82), each wedge insert comprising a plurality of circumferentially disposed segments (52a'-52e') each of which is separated from one another, during normal-inflated operation, by a plurality of intervening circumferential grooves (54a'-54d'); and

each groove is bounded by an outer surface (56') of a given segment and an inner surface (58') of an adjacent segment;

characterized in that:

the outer surface of a given segment and the inner surface of an adjacent segment intersect at a hinge point P, and the segments can therefore pivot with respect to each other.

2. The pneumatic radial ply runflat tire (70) of claim 1 characterized in that:

both the outer surface (56') and the inner surface (58') are flat.

3. The pneumatic radial ply runflat tire (70) of claim 1 characterized in that:

each wedge insert has a saw-tooth shaped cross-section.

4. The pneumatic radial ply runflat tire (70) of claim 1 characterized in that the outer surface of a given insert and the inner surface of an adjacent insert engage each other during runflat operation.

5. The pneumatic radial ply runflat tire (70) of claim 1 characterized in that:

the outer surface of a given insert and the inner surface of an adjacent insert are both non-flat surfaces.

6. The pneumatic radial ply runflat tire (70) of claim 1 characterized in that:

an inner liner (57) is disposed on the inner and outer surfaces of the segments.

7. The pneumatic radial ply runflat tire (70) of claim 1 characterized in that:

an inner liner is disposed between the wedge insert and an inner ply (30) of the tire.

8. The pneumatic radial ply runflat tire of claim 1, characterized in that:

the length of the inner and outer surfaces of the segments extend less than the thickness of the insert.

9. A pneumatic radial ply runflat tire (70, 100) having a tread (72), a carcass structure (86) comprising at least one radial carcass ply (88), two sidewalls (80,82) and at least one wedge insert (50a', 50b') disposed on an inner surface of each sidewall (80, 82), each wedge insert comprising a plurality of circumferentially disposed segments (52a'-52e') each of which is separated from one another, during normal-inflated operation, by a plurality of intervening circumferential grooves (54a'-54d'); and

each groove is bounded by an outer surface (56') of a given segment and an inner surface (58') of an adjacent segment;

characterized in that:

at least one of the outer surface of a given insert and the inner surface of an adjacent insert is a non-flat surface.

10. The pneumatic radial ply runflat tire of claim 9, characterized in that:

the outer surfaces (158) of selected ones of the segments are convex; and

the inner surfaces (156) of selected ones of the segments are concave.

11. The pneumatic radial ply runflat tire of claim 9, characterized in that:

the outer surface of a given segment is convex; and

the inner surface of an adjacent segment is concave;

wherein during runflat operation, when the outer surface engages the inner surface, axial deflection is substantially prevented.

12. The pneumatic radial ply runflat tire of claim 9, characterized in that:

the outer surface of a given segment is concave; and

the inner surface of an adjacent segment is convex;

wherein during runflat operation, when the outer surface engages the inner surface, axial deflection is substantially prevented.

13. The pneumatic radial ply runflat tire of claim 9, characterized in that:

the outer surface of a given segment and the inner surface of an adjacent segment surfaces intersect at a hinge point P, and the segments can therefore pivot with respect to each other.

14. The pneumatic radial ply runflat tire of claim 9 characterized in that the outer surface of a given insert and the inner surface of an adjacent insert engage each other during runflat operation.

15. The pneumatic radial ply runflat tire of claim 9 characterized in that:

an inner liner (57) is disposed on the inner and outer surfaces of the segments.

16. The pneumatic radial ply runflat tire of claim 9 characterized in that:

an inner liner is disposed between the wedge insert and an inner ply (30) of the tire.

17. The pneumatic radial ply runflat tire of claim 9, characterized in that:

the length of the inner and outer surfaces of the segments extend less than the thickness of the insert.

18. A pneumatic radial ply runflat tire (70, 100) having a tread (72), a carcass structure (86) comprising at least one radial carcass ply (88), two sidewalls (80,82) and at least one wedge insert (50a', 50b') disposed on an inner surface of each sidewall (80, 82), each wedge insert comprising a plurality of circumferentially disposed segments (52a'-52e') each of which is separated from one another, during normal-inflated operation, by a plurality of intervening circumferential grooves (54a'-54d'); and

each groove is bounded by an outer surface (56') of a given segment and an inner surface (58') of an adjacent segment;

characterized in that:

an inner liner (57) is disposed on a surface of the wedge insert.

19. The pneumatic radial ply runflat tire of claim 18, characterized in that:

the surface of the wedge insert is the inner and outer surfaces of the segments.

20. The pneumatic radial ply runflat tire of claim 18, characterized in that:

the inner liner is disposed between the wedge insert and an inner ply (30) of the tire.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
DN1999093		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US99/22779	30/09/1999	30/09/1999
International Patent Classification (IPC) or national classification and IPC B60C17/00		
Applicant THE GOODYEAR TIRE & RUBBER COMPANY et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

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   These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

I	☒	Basis of the report
II	☐	Priority
III	☐	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	☐	Lack of unity of invention
V	☒	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
VI	☐	Certain documents cited
VII	☒	Certain defects in the international application
VIII	☒	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
15/02/2001	21.01.2002
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Buergo, J Telephone No. +49 89 2399 8884

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/22779

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-4,6-20	as originally filed			
5,5A	as received on	17/11/2001	with letter of	05/11/2001

Claims, No.:

1-20	as received on	17/11/2001	with letter of	05/11/2001

Drawings, sheets:

1/5-5/5	as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-20
	No:	Claims	
Inventive step (IS)	Yes:	Claims	5,9,13
	No:	Claims	1-4,6-8,10-12,14-20
Industrial applicability (IA)	Yes:	Claims	1-20
	No:	Claims	

2. Citations and explanations
   see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

V. Reasoned statem nt

2. Citations and explanations

2.1 Document GB-A-867 103 (D1), which is considered to represent the most relevant state of the art, discloses (cf. page 2, lines 34 to 47, Figs. 1 and 2) a pneumatic runflat tire **1** having two sidewalls **2** and two wedge inserts **3** disposed on an inner surface of each sidewall, each wedge insert comprising a plurality of circumferentially disposed segments (ribs) **4-8**, each of which is separated from one another, during normal-inflated operation, by a plurality of intervening circumferential grooves (gaps) **9**, and each groove is bounded by an outer surface of a given segment and an inner surface of an adjacent segment, the outer surface of a given segment and the inner surface of an adjacent segment intersecting at a hinge point (not mentioned in D1 but clearly visible in the drawing figures), and the segments **4-8** being therefore able to pivot with respect to each other.

The tread and the carcass referred to in the preamble are common features to all radial tires. D1 is silent about the carcass type, but this feature does not seem to be relevant to the stated object. Since the invention relates to the runflat characteristics of the tire, the skilled person could make use of the sidewall inserts irrespective of the type of carcass ply.

The subject-matter of independent claim 1 does not meet the requirements of Article 33(3) PCT regarding inventive step.

2.2 The additional features of dependent claims 2 to 4 are also known from D1, cf. Figs. 1 and 2. These claims do not involve an inventive step either.

2.3 According to the description, page 16, lines 8-18, the additional feature of dependent claim 5 achieves the effect of preventing axial deflection of the sidewalls during runflat operation, as well as radial deflection. While this is not the solution to the stated problem, it contributes to improving the tire operation. The combination of the features of dependent claim 5 being neither known from, nor rendered obvious by, the available prior art, this claim is considered as involving

an inventive step (Article 33(3) PCT).

2.4 The features introduced by dependent claims 6-8 do not result in any subject-matter which can be considered as involving an inventive step, since they are not relevant to the solution of the stated problem.

2.5 Independent claim 9 is a repetition of claim 5 where the feature of the characterizing portion of claim 1 has been deleted. This claim seems to be superfluous, mainly taking into account that claim 5 has been positively considered. Claim 13 completes the wording of claim 5.

2.6 Claims 10-12 and 14-17, when dependent on claim 5 instead of claim 9, would be equally inventive. However, claims 11 and 12 contain an effect ("axial deflection is substantially prevented") instead of a technical feature.

2.7 The subject-matter of claims 18-20 cannot be considered as involving an inventive step, as already seen in section 2.4 above.

VII. Certain defects

The international application does not meet the requirement of Rule 6.1(a) PCT, which says that the number of claims shall be reasonable in consideration of the nature of the invention claimed. It is referred in particular to claims 9 to 20.

VIII. Certain observations

The vague and imprecise statement in the description on page 20 ("... the spirit and scope of the invention ...") implies that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity (Article 6 PCT) when used to interpret them (see also the PCT Guidelines, III-4.3a).

the invention described by the PCT/US98/13929 application thus addresses the design goals of full-inflated riding comfort, tire weight and extended runflat service life.

OBJECTS OF THE INVENTION

It is an object of the present invention to provide a runflat radial tire as defined in one or more of the appended claims and, as such, having the capability of being constructed to accomplish one or more of the following subsidiary objects.

One object of the present invention is to provide a runflat radial tire having one or more wedge inserts in each sidewall, the axially innermost or first wedge insert providing to each sidewall a minimal reinforcing rigidity during full-inflated operation and maximum reinforcing rigidity during runflat operation, thereby providing improved riding comfort and handling characteristics during normal-inflated operation as well as rigid structural support during runflat operation.

Another object of the present invention is to provide a runflat radial tire that contains sidewall-reinforcing wedge inserts that are light in weight and which contribute minimal excess rolling resistance during normal-inflated operation.

Yet another object of the present invention is to provide a runflat tire having a reduced heat generating potential during both normal inflated, high-speed operation and during runflat operation.

Still another object of the present invention is to provide a tire having an increased runflat operational service life and improved handling characteristics.

And yet another object of the present invention is to apply the inventive concept to a variety of alternative carcass constructions, as described herein.

SUMMARY OF THE INVENTION

The present invention relates to a pneumatic radial ply runflat tire having a tread, a carcass comprising a radial ply structure, a belt structure located between the tread and the radial ply structure, an innerliner and two sidewalls each reinforced by one or more wedge inserts. The first or

What is Claim d:

1. A pneumatic radial ply runflat tire (**70,100**) having a tread (**72**), a carcass structure (**86**) comprising at least one radial carcass ply (**88**) and two bead regions (**84a,84b**), a belt structure (**74**) between the tread and the radial carcass ply and two sidewalls (**80,82**) each reinforced by at least one circumferentially disposed wedge insert (**50a',50b'**), the tire (**70**) characterized by:

the at least one circumferentially disposed wedge insert (**50a',50b'**) within each sidewall (**80,82**) having a saw-tooth cross-sectional shape defined by a plurality circumferentially disposed segments (**52a'-52e'**) each of which is separated from each adjacent segment by a circumferential groove (**54a'-54d'**).

2. The pneumatic radial ply runflat tire (**70**) of claim 1 characterized in that both the radially outwardmost circumferential surface (**56'**) of each circumferential groove (**54a'-54d'**) and the radially inwardmost circumferential surface (**58'**) of each circumferential groove are flat.

3. The pneumatic radial ply runflat tire (**70**) of claim 1 characterized in that the radially outwardmost circumferential surface (**156**) of each circumferential groove (**154a-154d**) and the radially inwardmost circumferential surface (**158**) of each circumferential groove converge at the axially outwardmost and convex side of each circumferentially disposed, saw-tooth shaped, sidewall-reinforcing wedge insert (**150a,150b**).

4. The pneumatic radial ply runflat tire (**70**) of claim 2 characterized in that the outwardmost and inwardmost surfaces (**56',58'**) engage each other during runflat operation.

5. The pneumatic radial ply runflat tire (**70**) of claim

1 characterized in that the radially outwardmost circumferential surface (**156**) of each circumferential groove (**154a-154d**) and the radially inwardmost circumferential surface (**158**) of each circumferential groove are non-flat surfaces.

6. The pneumatic radial ply runflat tire (**70**) of claim 5 characterized in that the radially outwardmost circumferential surface (**56'**) of each circumferential groove (**54a'-54d'**) and the radially inwardmost circumferential surface (**58'**) of each circumferential groove converge at the axially outwardmost end of the grooves (**54a-54d**).

7. The pneumatic radial ply runflat tire (**70**) of claim 5 characterized in that the outwardmost and inwardmost surfaces (**157,158**) engage each other during runflat operation.

INTERNATIONAL SEARCH REPORT

Intern al Application No
PCT/US 99/22779

A. CLASSIFICATION F SUBJECT MATTER
IPC 7 B60C17/00 B60C13/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B60C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 867 103 A (METZELER GUMMIWERKE A.G.) page 1, right-hand column, line 75 -page 2, right-hand column, line 100; figures	1-7
A	US 3 782 440 A (DEPMEYER L) 1 January 1974 (1974-01-01) claims; figure 7	1
A	US 5 368 082 A (MCQUATE RAYMOND D ET AL) 29 November 1994 (1994-11-29) cited in the application	1
A	PATENT ABSTRACTS OF JAPAN vol. 015, no. 290 (M-1139), 23 July 1991 (1991-07-23) & JP 03 104710 A (BRIDGESTONE CORP), 1 May 1991 (1991-05-01) abstract	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 May 2000	19/05/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Baradat, J-L

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

information on patent family members

Inter nal Application No
PCT/US 99/22779

Patent document cited in search report	Publication date	Patent family member( )	Publication date
GB 867103 A		BE 568360 A	
		CH 361209 A	
		DE 1065288 B	
		FR 1165288 A	21-10-1958
		FR 1196581 A	25-11-1959
US 3782440 A	01-01-1974	AT 319069 B	10-12-1974
		BE 780945 A	17-07-1972
		DE 2113627 A	28-09-1972
		FR 2130476 A	03-11-1972
		GB 1378075 A	18-12-1974
		IT 950342 B	20-06-1973
		LU 64990 A	10-07-1972
		NL 7203518 A	22-09-1972
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		AU 4867793 A	14-04-1994
		AU 681561 B	28-08-1997
		AU 6802396 A	19-12-1996
		AU 681065 B	14-08-1997
		AU 6802496 A	19-12-1996
		BR 9303836 A	05-04-1994
		CA 2088382 A	31-03-1994
		DE 69315654 D	22-01-1998
		DE 69315654 T	10-06-1998
		EP 0590482 A	06-04-1994
		EP 0787603 A	06-08-1997
		JP 6191244 A	12-07-1994
		MX 9305781 A	31-03-1994
		US 5851324 A	22-12-1998
		US 5639320 A	17-06-1997
		US 5685927 A	11-11-1997
JP 03104710 A	01-05-1991	NONE	

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

To:
The Goodyear Tire and Rubber Comp.
c/o Robert W. Brown-Dept 823
Attn. COHN, H.
1144 East Market Street
Akron, Ohio 44309-3531
UNITED STATES OF AMERICA

Date of mailing *(day/month/year)* 19/05/2000	
Applicant's or agent's file reference DN1999093	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/US 99/ 22779	International filing date *(day/month/year)* 30/09/1999
Applicant THE GOODYEAR TIRE & RUBBER COMPANY et al.	

1. [X] The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Fascimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

[ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

[ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from th priority date, the applicant must perform th prescribed acts for entry into the national phase before all designated Offices which hav not been elected in the demand or in a later election within 19 months from th priority date or could not be elected because they are not bound by Chapter II.

Nam and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Amélie Möller

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international pbulication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped),whether

(i) the claim is unchanged;

(ii) the claim is cancelled;

(iii) the claim is new;

(iv) the claim replaces one or more claims as filed;

(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international appplication is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION** see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
DN1999093		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US 99/ 22779	30/09/1999	
Applicant		
THE GOODYEAR TIRE & RUBBER COMPANY et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the t xt is approved as submitted by the applicant.

   [ ] th t xt has been established, according to Rul 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from th date of mailing of this international search report, submit comments to this Authority.

6. Th figure of th **drawing** to be published with th abstract is Figure No. 7

   [X] as suggested by the applicant.

   [ ] None of the figures.

   [ ] because th applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

INTERNATIONAL SEARCH REPORT

International Application No
US 99/22779

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B60C17/00 B60C13/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B60C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 867 103 A (METZELER GUMMIWERKE A.G.) page 1, right-hand column, line 75 -page 2, right-hand column, line 100; figures	1-7
A	US 3 782 440 A (DEPMEYER L) 1 January 1974 (1974-01-01) claims; figure 7	1
A	US 5 368 082 A (MCQUATE RAYMOND D ET AL) 29 November 1994 (1994-11-29) cited in the application	1
A	PATENT ABSTRACTS OF JAPAN vol. 015, no. 290 (M-1139), 23 July 1991 (1991-07-23) & JP 03 104710 A (BRIDGESTONE CORP), 1 May 1991 (1991-05-01) abstract	1

☐ Further documents are listed in the continuation of box C.

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* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Baradat, J-L

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

National Application No
US 99/22779

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 867103 A		BE 568360 A	
		CH 361209 A	
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		FR 1165288 A	21-10-1958
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		US 5851324 A	22-12-1998
		US 5639320 A	17-06-1997
		US 5685927 A	11-11-1997
JP 03104710 A	01-05-1991	NONE	

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
DN1999093		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US 99/ 22779	30/09/1999	
Applicant		
THE GOODYEAR TIRE & RUBBER COMPANY et al.		

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2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

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   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No. 7

   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
[redacted]/US 99/22779

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B60C17/00 B60C13/02

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B. FIELDS SEARCHED

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IPC 7 B60C

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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 May 2000	19/05/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Baradat, J-L

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
US 99/22779

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
GB 867103	A		BE	568360 A	
			CH	361209 A	
			DE	1065288 B	
			FR	1165288 A	21-10-1958
			FR	1196581 A	25-11-1959
US 3782440	A	01-01-1974	AT	319069 B	10-12-1974
			BE	780945 A	17-07-1972
			DE	2113627 A	28-09-1972
			FR	2130476 A	03-11-1972
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			IT	950342 B	20-06-1973
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			NL	7203518 A	22-09-1972
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			AU	681561 B	28-08-1997
			AU	6802396 A	19-12-1996
			AU	681065 B	14-08-1997
			AU	6802496 A	19-12-1996
			BR	9303836 A	05-04-1994
			CA	2088382 A	31-03-1994
			DE	69315654 D	22-01-1998
			DE	69315654 T	10-06-1998
			EP	0590482 A	06-04-1994
			EP	0787603 A	06-08-1997
			JP	6191244 A	12-07-1994
			MX	9305781 A	31-03-1994
			US	5851324 A	22-12-1998
			US	5639320 A	17-06-1997
			US	5685927 A	11-11-1997
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